

Serial No. 09/879,724  
Amendment Dated May 19, 2003

Attorney Docket No. F0522  
Response To Office Action Dated April 4, 2003

#### REMARKS

Claims 1-3, 5 and 17-19 were previously pending. Claims 1, 5 and 18 have been amended. Claims 20-27 have been added. Following entry of this amendment, claims 1-3, 5, and 17-27 will be pending.

### I. REJECTION OF CLAIMS UNDER 35 U.S.C. § 102

Claim 18 stands rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 6,049,091 issued to Yokoyama ("Yokoyama"). Withdrawal of the rejection is respectfully requested for at least the following reasons.

Claim 18 includes, *inter alia*, the feature "wherein the LTCIM layer comprises at least one of doped amorphous silicon, undoped amorphous silicon and undoped porous silicon." Additionally, claim 18 as amended includes the feature "wherein when the LTCIM layer is doped amorphous silicon a dopant species is selected from one of **boron, phosphorous and fluorine**." (emphasis added).

Further, as illustrated in FIG. 1 of the present specification and reproduced below for the Examiner's convenience, amended claim 18 recites a semiconductor-on-insulator (SOI) structure 10. The SOI structure 10 includes a semiconductor substrate 12 (annotation added); a leaky, thermally conductive insulator material (LTCIM) layer 14 (annotation added) disposed directly on the semiconductor substrate 12; and a semiconductor layer 13 (annotation added) disposed directly on the LTCIM layer 14. (See, for example, page 6, lines 8-10).

Additionally, the material of the LTCIM layer 14 includes at least one of doped amorphous silicon, undoped amorphous silicon and undoped porous silicon. Further, when the LTCIM layer 14 is doped amorphous silicon, a dopant species is selected from one of **boron, phosphorous and fluorine** (annotation added). Further still, the LTCIM layer 14 extends over an entire lateral dimension of the semiconductor substrate 12. (See, for example, FIGS. 1-4 and page 6, lines 15-22 and page 7, lines 11-16).

Serial No. 09/879,724  
Amendment Dated May 19, 2003

Attorney Docket No. F0522  
Response To Office Action Dated April 4, 2003

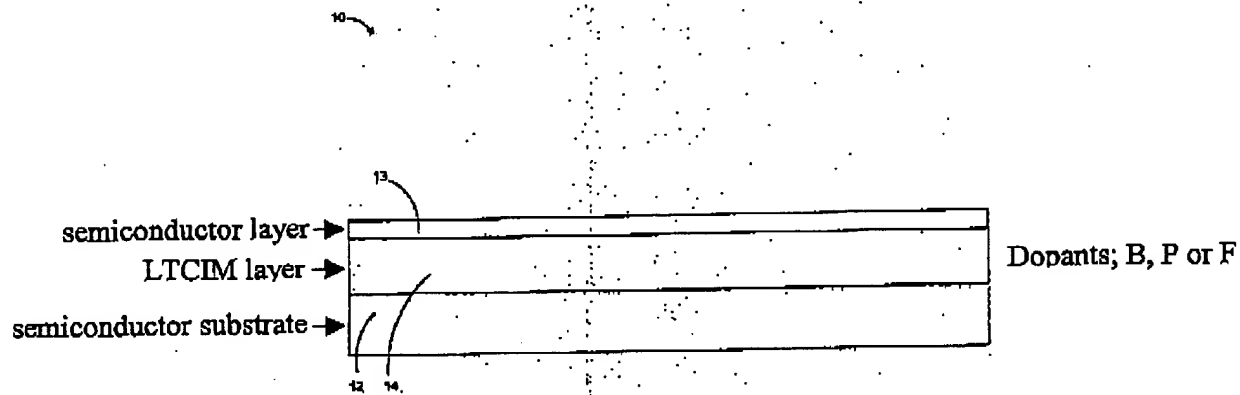


Figure 1: FIG. 1 of Present Specification

Referring now to FIG. 2 of Yokoyama also reproduced below for the Examiner's convenience, Yokoyama discloses a field effect transistor including a substrate 1 (annotation added), an amorphous semiconductor layer 32 (annotation added) and a semiconductor layer 12 (annotation added). The amorphous semiconductor layer 32 is formed on the substrate 1. Further, the semiconductor layer 12 is formed on the amorphous semiconductor layer 32. Yokoyama discloses the amorphous semiconductor layer 32 is made of **amorphous silicon hydride** (annotation added) containing impurities doped therein. (See, for example, FIG. 2 and Col 6, lines 43-59).

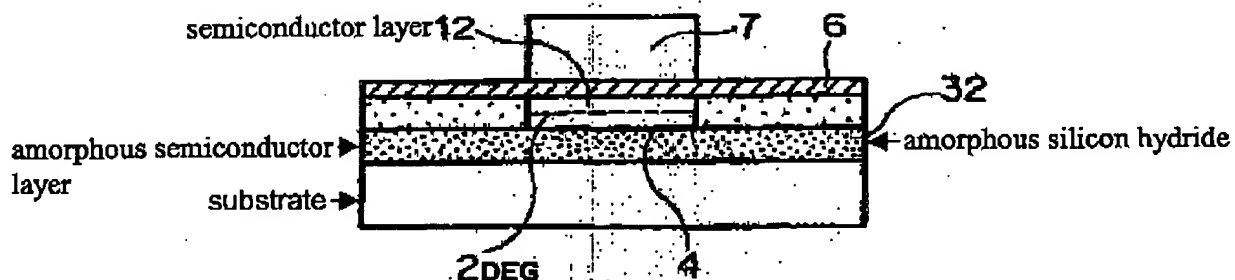


Figure 2: FIG. 2 of Yokoyama

Yokoyama does not disclose the dopant species of the amorphous semiconductor layer 32 to be selected from one of **boron, phosphorous and fluorine** as claimed in amended claim 18.

Yokoyama specifically discloses the dopant species to be hydrogen. Further, Yokoyama discloses

Serial No. 09/879,724  
Amendment Dated May 19, 2003

Attorney Docket No. F0522  
Response To Office Action Dated April 4, 2003

the amorphous semiconductor layer 32 to be **amorphous silicon hydride** (see, for example, FIGS. 2, 3B and 3C and Col. 7, lines 12-22).

Therefore, since Yokoyama does not teach or suggest one or more of the features as claimed in amended claim 18, claim 18 and the claims that depend directly or indirectly from amended claim 18 are patentable over Yokoyama for at least the reasons stated above.

## II. REJECTION OF CLAIMS UNDER 35 USC §103(a)

Claims 1-2, 17 and 19 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Yokoyama in view of Japanese Patent No. JP 2001-148479 issued to Be ("Be"). Claims 1-3 and 5 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Yokoyama in view of U.S. Publication No. 2002/0096717 issued to Chu et al. ("Chu"). Withdrawal of the rejections is respectfully requested for at least the following reasons.

Claim 1 as been amended includes, *inter alia*, the feature "wherein the LTCIM layer comprises at least one of doped amorphous silicon, undoped amorphous silicon and undoped porous silicon." Additionally, claim 1 includes the feature "wherein when the LTCIM layer is doped amorphous silicon a dopant species is selected from one of **boron, phosphorous and fluorine**." (emphasis added). Accordingly, amended claim 1 is believed to be patentable over Yokoyama for at least the reasons stated above with respect to similar features discussed with regard to claim 18. Further, Be does not make up for the deficiencies of Yokoyama, i.e., Be does not teach or suggest a LTCIM layer as claimed in amended claim 1. Further still, Be teaches away from that which is claimed as further discussed below.

Referring now to FIGS. 2 and 4 of U.S. Patent No. 6,049,091 issued to Bae ("Bae") (Bae is the U.S. Patent corresponding to the Japanese Patent No. JP 2001-148479 cited by the Examiner in the above-identified Office Action.) also reproduced below for the Examiner's convenience, Bae discloses a semiconductor device having a quasi-SOI structure. FIG. 2 illustrates one embodiment of the semiconductor device, whereas FIG. 4 illustrates an intermediate step in the manufacture of the semiconductor device shown in FIG. 2.

The quasi-SOI structure includes a silicon substrate 21 (annotation added), a porous silicon layer 23b and 23 (annotation added) and an upper silicon layer 25a and 25 (annotation added). The

Serial No. 09/879,724  
Amendment Dated May 19, 2003

Attorney Docket No. F0522  
Response To Office Action Dated April 4, 2003

porous silicon layer 23b becomes a passage for **partial** contact between the lower silicon layer 21 (the silicon substrate) and the upper silicon layer 25a. Bae further discloses an isolating insulation layer 33a shaped as an inverse T and made of thermal oxide (annotation added). (See, for example, FIGS. 2 and 4, and Col 4, lines 9-26, Col 4, line 65 to Col 5 line 7). The thermal oxide formed is a silicon-based oxide as the thermal oxide forms on the exposed surfaces of the silicon substrate and the porous silicon layer 23. The present invention replaces the conventional buried oxide layer with a LTCIM layer. Thus, there would be no motivation to combine the teachings of Bae with the teachings of Yokoyama.

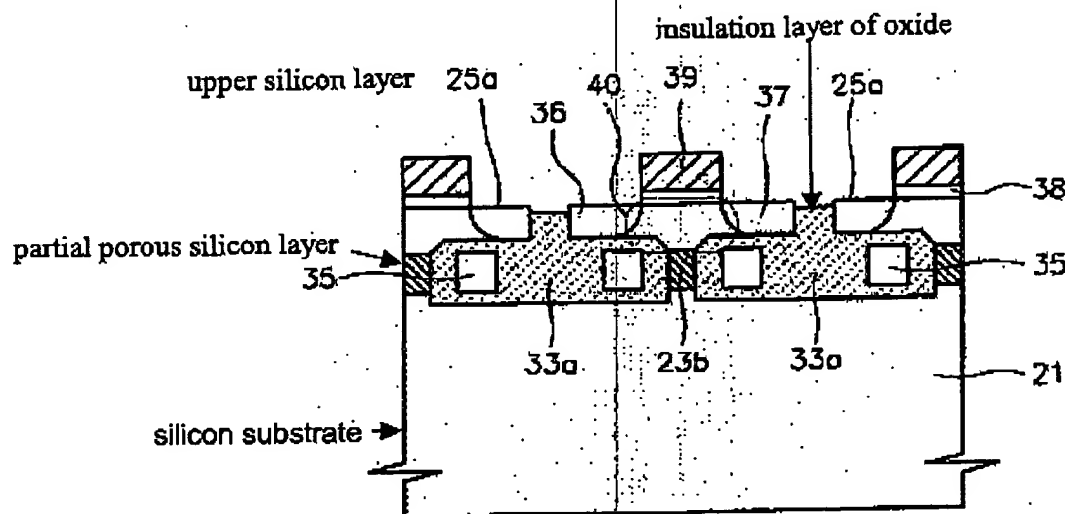


Figure 3: FIG. 2 of Bae

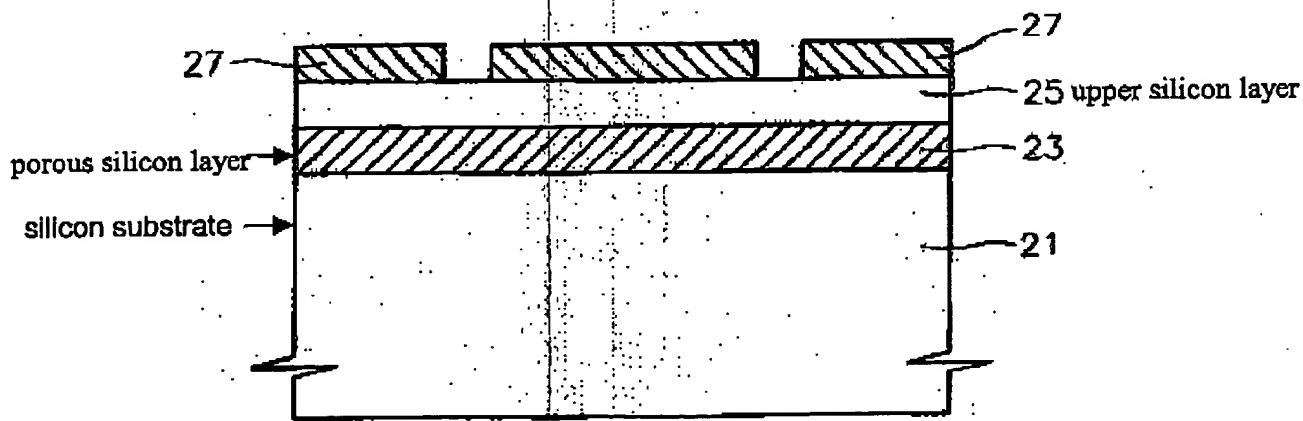


Figure 4: FIG. 4 of Bae

Serial No. 09/879,724  
Amendment Dated May 19, 2003

Attorney Docket No. F0522  
Response To Office Action Dated April 4, 2003

Therefore, since Yokoyama alone or in combination with Be (Bae) does not teach or suggest one or more of the features as claimed in amended claim 1, claim 1 and the claims that depend directly or indirectly from claim 1 are believed to be in condition for allowance for at least the reasons stated above. Further, since Yokoyama alone or in combination with Be (Bae) does not teach or suggest one or more of the features as claimed in amended claim 18, the claims that depend directly from claim 18 are believed to be in condition for allowance for at least the reasons stated above.

Chu does not make up for the deficiencies of Yokoyama. Therefore, since Yokoyama alone or in combination with Chu does not teach or suggest one or more of the features as claimed in amended claim 1, claim 1 and the claims that depend therefrom are believed to be in condition for allowance for at least the reasons stated above.

### III. NEW CLAIMS

The newly added claims, i.e., claims 20-27, claim additional novel and unobvious features of the present invention. For example, in one embodiment, the semiconductor layer 13 comprises germanium. The features of claims 20-27 are supported by the specification and no new matter is believed to be added. (See, for example, page 9, lines 7-9). Therefore, claims 20-27 are believed to be allowable for at least the reasons stated above with regards to amended claims 1 and 18.

### IV. CONCLUSION

In light of the foregoing, it is respectfully submitted that the present application is in condition for allowance and notice to that effect is hereby requested. If it is determined that the application is not in condition for allowance, the Examiner is invited to initiate a telephone interview with the undersigned attorney to expedite prosecution of the present invention.

It is not believed that extensions of time or fees for net addition of claims are required, beyond those that may otherwise be provided for in documents accompanying this paper. However, in the event that an extension of time is necessary to allow consideration of this paper, such

Serial No. 09/879,724  
Amendment Dated May 19, 2003

Attorney Docket No. F0522  
Response To Office Action Dated April 4, 2003

extension is hereby petitioned under 37 C.F.R. § 1.136(a), and any fees required therefore and any additional fee (including fees for net addition of claims) resulting from this communication are hereby authorized to be charged to our Deposit Account No. 18-0988; Our Order No. F0522 (AMDSP0414US).

Additionally, any additional fee resulting from this communication (including fees for net addition of claims) are hereby authorized to be charged to our above-identified Deposit Account.

Respectfully submitted,

RENNER, OTTO, BOISSELLE & SKLAR, LLP



Andrew Romero, Reg. No. 43,890

1621 Euclid Avenue, 19th Floor  
Cleveland, Ohio 44115-2191  
Telephone: (216) 621-1113  
Facsimile: (216) 621-6165

R:\ARomero\Cases\AMDSP0414US\Reply to Office Action dated 040403.doc

FAX RECEIVED

MAY 19 2003

TECHNOLOGY CENTER 2800